



CTIA

Building The Wireless Future™
Cellular Telecommunications Industry Association

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Vice President/General Counsel

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

February 19, 1999

Ms. Magalie Roman Salas
Office of the Secretary
Federal Communications Commission
The Portals
445 Twelfth Street, SW
12th Street Lobby, TW-A325
Washington, DC 20554

Re: *Ex Parte* Presentation
CC Docket No. 94-102

Dear Ms. Salas:

On December 4, 1998, the Cellular Telecommunications Industry Association ("CTIA") submitted its written response to ten questions posed by the Commission staff to aid in its resolution of the relative merits of alternate technical methods of completing 9-1-1 emergency calls over analog cellular networks. On January 29, 1999, CTIA met with the Commission's staff to discuss its response. At that meeting, the Commission staff asked CTIA to supplement its answers to Questions 1, 2, 4, and 10.

Attached to this letter are CTIA's supplemental answers as well as CTIA's description of the wireless industry's *Automatic A/B Roaming* proposal for completing 9-1-1 emergency calls over analog cellular networks.

Pursuant to Section 1.1206 of the Commission's Rules, an original and one copy of this letter is being filed with your office. If you have any questions concerning this submission, please contact the undersigned at (202) 736-3248.

Sincerely,

Michael Altschul

cc: Mr. James D. Schlichting
Mr. Ron Netro

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Wireless Industry Response to FCC's Follow-on Questions

Question 1.

The only reprogramming required to implement "Automatic A/B Roaming" is to enable the handset to recognize initiation of 9-1-1 emergency calls and remove the alternate carrier restrictions, if enabled, as described below. In the presence of a decodable Forward Control Channel (FOCC) from the preferred carrier, the call would never be switched to the alternate carrier. Having selected a FOCC, Automatic A/B Roaming would consider the call "completed" (i.e., cease autonomous processing and return idle) when any of the following criteria are met:

- a) an origination request was successfully sent on the Reverse Control Channel (RECC) (i.e., the busy/idle bit on the FOCC was idle before the RECC transmission began and changed to busy between 56 bits and 106 bits into the transmission of the request) or;
- b) the number of retries to accomplish sending the origination request reached the limit (normally at least 10) or;
- c) the origination timer (6-12 seconds) expired.

Question 2.

For each of the call completion/programming modes presented to the FCC, the answer to the original question is: "Yes, it is possible for a call to be locked-in to the preferred carrier so that the call would not be switched in any case in which the caller could not in fact communicate on the voice channel". This is a true statement for both preferred and non-preferred carriers, and all of the listed call completion / programming modes: A preferred/B preferred; Strongest/Adequate Signal; Automatic A/B Roaming. As described below, the Intelligent Retry proposal submitted to TIA in conjunction with the Automatic A/B Roaming proposal addresses this concern by initiating a new attempt to complete the 9-1-1 call if the "handshake" establishing a voice channel times out.

A call can be kept on a carrier's network if the selected FOCC (regardless of how selected) appears to be properly received and decoded but voice communication cannot be established for any number of reasons, including:

- a) The cell has no available voice channels to allocate that are compatible with the mobile. Directed retry (to the second best cell) is either not enabled, not possible, or fails as well. (This also would be exacerbated by emergency call completion methods that tend to distribute calls unevenly between the carriers.);
- b) The RECC is overloaded with call requests and/or registration requests, effectively shutting it down (the base station receiver hears only a din of signals), so that only the few strongest and luckiest mobiles can occasionally be heard successfully over the

cacophony. The RECC protocol for contention resolution is known to be very "fragile". (Emergency call completion methods that tend to distribute calls unevenly between the carriers would exacerbate this.);

c) The mobile transmitter power is insufficient for its request to be heard above the background noise or interference on the RECC;

d) The mobile successfully receives the voice channel assignment and re-tunes but its transmitter power is insufficient for the modulated Supervisory Audio Tone (SAT) to be detected by the base station above the background noise or interference on the voice channel (a frequency discriminating detector). The speech path will be cut through only when SAT is properly detected. If either the mobile or the base station fail to detect SAT for 5 seconds running, both must abandon the call.

Neither Automatic A/B Roaming or Strongest/Adequate Signal changes the standard call setup methodology of making one concerted attempt at setting up the call then allowing the user to initiate another attempt if the resulting call failed to reach a satisfactory conclusion. The Motorola suggestion of Intelligent Retry, now before the TR45 standards body, will automatically select and retry on the alternate carrier if a lock-in situation, such as those above, repeatedly results in lack of a normal call conclusion (normal disconnect).

Question 4.

The proposed Automatic A/B Roaming process behaves exactly like the process applied to ordinary calls except for the overriding of the A-only and B-only (and other restrictive) programming modes for 9-1-1 calls. This is one of the great advantages of the Automatic A/B/ Roaming approach. Because of the relatively minor change to the phone's programming, it is believed to be relatively easy to begin to manufacture - and therefore could be accomplished expeditiously.

Question 10:

In response to CTIA's response to the FCC's original Question #10¹, the FCC staff has asked if "many calls [using Automatic A/B Roaming] will be handled by the preferred carrier even though the control channel signal strength does not meet the threshold established [by the Ad Hoc Alliance] for the Strongest/Adequate Signal proposal?"

The answer is yes, many calls will be handled by the preferred carrier even though the control channel signal strength is less than the threshold proposed by the Ad Hoc Alliance. This is because cellular systems (and the AMPs standard) are engineered to

¹ "In general, in what ways is Automatic A/B Roaming superior in completing 9-1-1 calls to current practice and rules, A/B, and Strongest/Adequate Signal? In what ways is it inferior?"

reliably complete such calls. Therefore, more calls will be completed by the preferred carrier using Automatic A/B Roaming as compared to "Strongest or Adequate Signal".

Automatic A/B Roaming functionality is invoked only as necessary to complete a 9-1-1 call when the preferred carrier is unable to process the 9-1-1 call (i.e., for a very small minority of 9-1-1 call attempts). On the other hand, both the strongest signal and adequate signal approaches result in 9-1-1 calls being processed by the non-preferred carrier approximately 50% of the time. Based on the Trott signal strength measurements in Atlanta and Dallas dated October 18, 1996 (and placed in the record of CC Docket 94-102 by the Ad Hoc Alliance), Automatic A/B Roaming would have allowed for E9-1-1 call completion by the preferred carrier, except in a few instances where neither carrier would have been able to provide a satisfactory connection (i.e., the Rock Creek Park type of situation where neither carrier provides coverage). On the other hand, using the same Trott data on Atlanta and Dallas, the "Strongest Signal" concept would have resulted in carrier "A's" customers' 9-1-1 calls being processed by the "B" carrier ~44% of the time, and carrier "B's" customers' 9-1-1 calls being processed by the "A" carrier ~56% of the time. The "Adequate Signal" concept would have resulted in carrier "A's" customers' 9-1-1 calls being processed by the "B" carrier ~30% of the time, and carrier "B's" customers' 9-1-1 calls being processed by the "A" carrier ~48% of the time.

Description of Automatic A over B Roaming¹

- a. When the user dials 9-1-1, if the analog mobile phone is already registered on a network, the call will be attempted using that network's strongest available control channel.²
- b. If a call attempt is made, the call must not be blocked due to an overload class restriction.
- c. When 9-1-1 is dialed, the analog mobile phone overrides any user programming or feature(s) which prevent scanning of the non-preferred side (i.e. B in this example) and defaults to the standard, preferred (A) over non-preferred (B) scanning algorithm, dependent on the analog phone's System Identification (SID) (e.g. A over B or B over A).
- d. When a 9-1-1 call attempt is made, if the call fails and the analog mobile phone is tuned to the strongest access channel on the current side, the call is then re-attempted on the current side.
- e. If the call attempt fails again on the current side, than the mobile will scan the other side (non-preferred), and the call is attempted again.
- f. If all attempts on both the preferred side and non-preferred side are unsuccessful, then the mobile station will rescan and attempt call placement again, starting with the preferred side. The analog mobile phone will continue this process for a preset number of times.³
- g. If the 9-1-1 call terminates in a manner other than the user ending the call or the base station releasing the call, the base station may attempt to re-page the mobile on the same network thereby reestablishing the 9-1-1 call (as defined in the E9-1-1 Phase 1 standard, J-STD-034).

¹ For the purpose of the following description, the preferred carrier is A, non-preferred is B.

² If the analog mobile phone is not registered, registration will be initiated when powered on.

³ The phone manufacturer shall determine the number of tries, which shall be at least a minimum of two tries.

Text for Automatic A over B Roaming

Essential Elements:

1. Automatic A over B Roaming is intended to enhance emergency 9-1-1 call completion on analog wireless networks.
2. Following exhaustive examination and investigation into the *Strongest Signal/Threshold Signal* proposal advocated by the Ad Hoc Alliance for Public Access to 9-1-1, as well as other approaches to completing 9-1-1 calls, the industry developed and recommends adoption of *Automatic A over B Roaming*. The industry believes the public will be best served if *Automatic A over B Roaming* were implemented. The *Automatic A over B Roaming* process provides a higher probability of a 9-1-1 call being completed, and provides a higher rate of calls being completed by the subscriber's preferred carrier, with reduces the impact on carriers' networks. Moreover, *Automatic A over B Roaming* is less burdensome for manufacturers to implement.
3. *Automatic A over B Roaming* better supports the goals and requirements established by FCC CC Docket 94-104, whereby wireless subscribers attempting access to 9-1-1 services on their preferred carrier would have more reliable access to enhanced emergency services (e.g. ANI and ALI) than if the calls were completed by the non-preferred carrier.
4. EIA/TIA 553-A, the analog air-interface specification provides for but does not require an attempt to access the non-preferred system. However, most analog mobile phones can be programmed as *A preferred* or *B preferred* instead of *A only* or *B only*. Therefore, it is understood that Automatic A over B Roaming will require *minimum* modifications to the technical standard.
5. A call attempt can be considered *completed* when the analog mobile phone successfully confirms SAT (supervisory audio tone) on the Voice Channel and enters the "*Conversation State*".
6. If the analog mobile phone does not reach *Conversation State* within twelve (12) seconds, the analog mobile phone may automatically reattempt the 9-1-1 call origination.
7. While the analog mobile phone attempts to complete the 9-1-1 call automatically, feedback should be provided giving the user a status of call processing.
8. Voice connection to Emergency 9-1-1 should be completed in a time period considered "reasonable" to the average caller.